

AWARDS

Army Organization Wins Dual-Use Science And Technology (DUS&T) Achievement Award For 2000

Dr. Delores Etter, Deputy Under Secretary of Defense for Science and Technology, presented the first annual DUS&T Achievement Award on Nov. 8, 2000, at the Commercial Technology for the Warfighter Conference in Tysons Corner, VA. The DUS&T Achievement Award was established to recognize successful dual-use projects and to honor DOD employees responsible for their initiation and execution.

This year's award (for FY00 accomplishments) was presented to Project Manager Brad McNett and Project Engineer and Team Leader Mark A. Mushenski, both from the U.S. Army's Tank-automotive and Armaments Command's (TACOM's) National Automotive Center (NAC), for work done on the DUS&T project, Electronically Controlled Active Braking System for Medium Duty Vehicles. McNett and Mushenski both received trophies and will share a \$5,000 cash award. The TACOM project was selected from 12 projects that had been submitted by the Army, Navy, and the Air Force. Navy and Air Force runners-up also received trophies and cash awards of \$2,500.

The DUS&T Program was established by the National Defense Authorization Act of FY 1998, which made dual-use technology development an acceptable alternative to traditional development processes used by military departments. Through the DUS&T Program, a DOD agency partners with industry to develop state-of-the-art technologies that are both commercially viable and militarily relevant. Since its creation, the DUS&T Program has funded more than 300 projects totaling more than \$900 million, with industry funding more than half of the development costs.

Etter told the conference's 250 attendees, "Our mission is to be sure that we are developing affordable and superior technology for the warfighter." She went on to say that affordability is essential to provide "the superior technology needed by our warfighters."

Contributions by the winner and runners-up are described below.

Winner—Electronically Controlled Active Braking System for Medium Duty Vehicles—TACOM/NAC and Continental Teves. The Electronically Controlled Active Braking System for Medium Duty Vehicles project was designed to advance the state-of-the-art technology for the Antilock Braking System (ABS) and the low-speed Traction Control System (TCS). The project also demonstrates the feasibility of integrating these technologies on a variety of commercial vehicles including the High Mobility Multipurpose Wheeled Vehicle (HMMWV). Specific tasks included determining size and characteristics of the

HMMWV brake system platforms; developing requirements for the booster, master cylinder, and hydraulic control unit; designing and building the components; and integrating and demonstrating the performance of the systems in winter and summer test conditions. The braking system will provide the soldier with greater stopping capability while maintaining control of a vehicle, something already available in the private sector.

AM General, the current manufacturer of the HMMWV and commercial Hummer, notified Continental Teves (NAC's industry partner) that it was selected to adapt ABS/TCS to the next generation A4 HMMWV version and the commercial Hummer. With the HMMWV's needs designed into the commercial product, the Army benefits directly by having their ABS units manufactured along with the commercial components. Because the military ABS units will be using common commercial parts and both ABS systems can be manufactured together on the same production lines, the resulting savings will be passed along to the Army. Between 3,000 and 4,000 HMMWV A4s will be produced each year. Without a commercial base to fall back on (estimated to be more than 50,000 units per year starting in mid-2002), this will be a costly effort. The estimated cost for the ABS/TCS is less than \$500 to \$700 per vehicle with a commercial base and \$2,500 per vehicle without a commercial base, a savings of \$1,800 per vehicle.

Continental Teves plans to manufacture MK50 ABS units worldwide as well as provide product support. This benefits the Army by providing a readily available ABS system, thereby easing the logistics burden.

Runner-Up—Renewal of Legacy Software Systems—Charles D. Caposell, Electronics Engineer, Naval Air Systems Command; and CPU Technology. This Navy project has the potential of saving the Navy \$1 billion in operations and support costs over the next decade. The project has resulted in a family of configurable processor frameworks called CFrame that will allow aging and obsolete hardware to be updated without costly software rewrites and validation. Initial applications of the technology involve modernizing a radar processing system and an airborne radar computer for the F-16. The company is currently seeking opportunities in the commercial aerospace community.

Runner-Up—Future Air Navigation and Traffic Avoidance Through Integrated Communications Navigation & Surveillance—Joel Arnold, Project Engineer, Air Force Research Lab; and Rockwell Collins. This Air Force project has resulted in



DUS&T Award recipients (left to right) are Joel Arnold (USAF), Charles Caposell (Navy), Brad McNett (Army), and Mark Mushenski (Army).

development and demonstration of a cost-effective solution for upgrading tactical fighters and general aviation (private aircraft and business jets) to comply with FAA requirements that all aircraft be capable of reporting their Global Positioning System position, altitude, heading, and airspeed. The product is transitioning to both the military and commercial sectors.

MANPRINT In The Joint LW155 Howitzer Program

Each year, the Army's Deputy Chief of Staff for Personnel sponsors a Manpower and Personnel Integration (MANPRINT) Symposium hosted by the Director for Personnel Technologies. Last year's event was held in Crystal City, VA, Sept. 27-28. Based on feedback from the more than 170 attendees, it was a huge success. The theme was "MANPRINT in Support of the Army's Transformation Campaign Plan," and the keynote speaker was GEN John M. Keane, Army Vice Chief of Staff.

Keane addressed some of the major issues facing today's Army. He highlighted the need for MANPRINT and its role in the acquisition and modernization process, and stressed that the Army is committed to MANPRINT because "we have to get it right for our soldiers." Following presentations by other senior Army officials, LTG Timothy J. Maude, then Army Deputy Chief of Staff for Personnel, presented the annual 1999 MANPRINT Awards.

It is notable that one of the awards recognized the success of a joint program. A MANPRINT Practitioner of the Year Award was presented to the Lightweight 155mm (LW155) Howitzer MANPRINT Team consisting of Timothy Kogler, Diane Mitchell, Richard Kozycki, Charnetta Baugham, and Jim Faughn, all from the Army Research Laboratory's Human Research and Engineering Directorate (ARL-HRED); and Marine Corps Gunnery Sergeants Anthony Nicholas and Jeffrey Altman.

The LW155 Howitzer MANPRINT Team represents one of the first truly joint teams to establish and effectively integrate a strong MANPRINT program. The LW155 Howitzer MANPRINT Program is managed by Marine Corps COL Steve Ward and executed by a Joint Army-Marine Corps staff as part of the Army's Program Executive Office for Ground Combat and Support Systems. The LW155 prime contractor is BAE SYSTEMS from the United Kingdom, which recently selected its U.S. partners to conduct more than 70 percent of LW155 production in the United States.

The program is currently in the engineering and manufacturing development (EMD) phase, having undergone a Milestone I/II review in FY96. The XM777 (the developmental version of the LW155) will replace the M198 155mm Howitzer. It will meet or exceed all capabilities of the current M198 Howitzer while reducing the system weight from

16,000 to 9,000 pounds. The LW155 Program entered formal acquisition status through a combined Milestone I/II review, bypassing the traditional program-definition and risk-reduction phases. The LW155 team had to work aggressively to complete the human factors engineering (HFE) evaluation and address human factors concerns early in the EMD phase of the program.

A total of 64 HFE concerns were identified. Currently 60 of these concerns have been resolved, and solutions to the remaining 4 are being sought. The ARL-HRED team members and the USMC gunnery sergeants used modeling tools including TRANSCOM-JACK and the Improved Performance Research Integration Tool (IMPRINT) to assess the XM777's performance and usability during EMD before weapons were constructed. Together, these modeling efforts represented an aggressive approach to reducing program risk by using state-of-the-art human factors modeling tools.

MANPRINT has been a critical element in the program's success to date. The application of MANPRINT tools and techniques to assess the howitzer's design and performance early in the EMD phase is estimated to have saved more than \$6 million in design and development costs.

Defense Secretary Honors Army Science Board

During a special Pentagon ceremony on Jan. 8, 2001, then Secretary of Defense William S. Cohen paid tribute to the Army Science Board (ASB) and its Chairman Michael Bayer for significant contributions to the future Army and joint ground forces. Bayer was personally presented with the Defense Distinguished Civilian Service Award. The role of the ASB is to provide independent outside advice on future technological trends and other warfighting issues. Members include distinguished individuals from industry, academia, and non-DOD government agencies.

Secretary Cohen termed the ASB an exceptional group of individuals who have helped educate the Army and DOD while "keeping us considerably ahead of catastrophe as we race into this century." Cohen further credited the board with tackling a daunting array of topics critical to our future defense and with transforming a Cold War Army into a lighter, more lethal, and better-equipped force.

Bayer was individually cited for exceptional distinguished public service as ASB Chairman and for significant contributions to the transformation of DOD's joint ground forces and joint capabilities. Said Cohen: "Mr. Bayer consistently distinguished himself by providing inspirational leadership and visionary guidance to the Department of Defense through leading numerous study efforts directly impacting on the success of the Department's transformation efforts."

Defense Manufacturing Technology Awards Presented

Introduction

The second annual Defense Manufacturing Technology Achievement Awards were presented late last year at the Defense Manufacturing Conference in Tampa Bay, FL. Two awards were presented at the conference. The Army had the distinction of participating in both of the award-winning projects. One award honored an Army/university/industry project on Advanced Optics Manufacturing. The other award recognized a tri-Services/industry project on Flexible Manufacture of Microwave Vacuum Devices. The awards are sponsored by the Office of the Deputy Under Secretary of Defense for Science and Technology and the Joint Defense Manufacturing Technology Panel.

These awards recognize those individuals most responsible for outstanding technical accomplishments in achieving the vision of the DOD Manufacturing Technology Program (MANTECH). That vision calls for a responsive world-class manufacturing capability to affordably meet the warfighters' needs throughout the Defense system life cycle.

Listed by project category, recipients of the award, their duty stations, and a description of their achievements are as follows:

Advanced Optics Manufacturing

Team members in this category are Stanley P. Kopacz, U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center (TACOM-ARDEC); Robert T. Volz, U.S. Army TACOM-ARDEC; Walter N. Roy, U.S. Army Research Laboratory; Harvey M. Pollicove, Director, Center for Optics Manufacturing, University of Rochester; Dr. Stephen D. Jacobs, Center for Optics Manufacturing, University of Rochester; Donald Golini, President, QED Technologies, LTD; and William I. Kordonski, QED Technologies, LTD.

Achievements: Optics are vital to DOD for precision guidance, reconnaissance, situational awareness, fire control, and autonomous weapons operation. Traditional optical shapes and materials are inadequate for next-generation systems such as the Objective Individual Combat Weapon, Comanche, and advanced missiles and night-vision devices. The range, accuracy, and imaging resolution of optical systems are directly related to surface accuracy and finish. This team is credited with developing a revolutionary technology called magnetorheological finishing (MRF), which takes the mystery out of precision finishing. Optical surfaces are polished in a computer-controlled MRF slurry. This process provides extreme accuracy and stability that makes possible the fabrication and polishing of exceptionally precise spherical, aspheric, and nontraditional freeform optical shapes.

This technology will have a positive effect on every military system that requires the fabrication of nonspherical optics. A cost avoidance of more than \$100 million is forecast for applications to include Stinger, Comanche, the Daylight Targeting System, the Advanced Precision Kill Weapon System, the Joint Standoff Weapon, and the Objective Crew Served Weapon.

As a result of this project, conducted through the Army MANTECH Program, the Q22 MRF machine is commercially

available and has received industry-wide acclaim. MRF is now a fully accepted, standard manufacturing process and is receiving widespread industrial-base application. In its first year of commercial availability, MRF won the optical industry's two most prestigious awards for technology innovation and achievement: the Photonics' Circle of Excellence Award and the Laser Focus World Commercial Technology Achievement Award.

Flexible Manufacture Of Microwave Vacuum Devices

Team members in this category are John Reinhardt, U.S. Army Aviation and Missile Command's Aviation and Missile Research, Development and Engineering Center; Walter F. Spaulding, U.S. Air Force Research Laboratory; John J. Olewnik, Office of Naval Research; Phillip H. Davis, American Competitiveness Institute (ACI); Peter Kolda, Communications & Power Industry (CPI), Palo Alto, CA; Bartley M. Gannon, Northrop Grumman; and Joel A. Christeson, Teledyne Electronics Technologies.

Achievements: Traveling wave tubes (TWTs) are critical components for ground-based radars and missile seekers such as the PATRIOT Advanced Capability-3 (PAC-3) guided missile. This team is credited with improving the manufacturing processes and reducing the cost of producing the millimeter-wave class of devices. The projected cost avoidance to PAC-3 alone is expected to be more than \$19 million. The Flexible Manufacture of Microwave Vacuum Devices project is a tri-Service/industry effort that included \$1.6 million from the Army MANTECH Program.

Three companies—CPI, Northrop Grumman, and Teledyne—led by ACI, a nonprofit organization, shared their findings on manufacturing improvements for devices used in critical segments of the power/frequency spectrum. CPI focused on the higher frequency (millimeter wave) used in the PAC-3 TWTs, developing a manufacturing capability for cost-effective coupled cavity devices. Northrop Grumman focused on the development of manufacturing improvements for lower frequency devices using new automation to greatly reduce cost and increase yield. Teledyne focused on the manufacturing process for the midfrequency (Ka and Ku Band), specifically the manufacture and test of the critical helix element, leading to significantly improved yield and reduced cost.

Conclusion

The MANTECH awards discussed in this article are just two examples of how cooperative efforts among DOD, industry, and academia can produce revolutionary processes and products that fulfill military needs while greatly benefiting the private sector.

The objectives of the Army MANTECH Program are to advance the state-of-the-art in manufacturing technologies, improve end-item quality through process control, leverage multiple system needs, reduce costs and program risks of Army materiel acquisitions, and transfer technology to the industrial base. Further information on the Army MANTECH Program can be obtained from the Web site located at <http://www.armymantech.com/>.

The preceding article was written by Carol Gardinier, U.S. Army Materiel Command Program Manager for the Army MANTECH Program.